A Usability Study of an Assistive Touch Voice Interface based Automated Teller Machine (ATM)

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Traditional ATM user interfaces are text heavy and are not designed for use by low and non-literate users. We surveyed 88 randomly selected ATM users, and found a high occurrence of PIN loss, confusion between touch screen and physical buttons, anxiety in case of anomalous machine behavior, and hesitation and fear of using an ATM among low and non-literate users. We then proposed and evaluated an assistive touch voice interface, that at the push of an on-screen "speaker" icon, read out in Urdu (the local language) the text written next to the icon. 25 literate and 25 non-literate users were recruited to test a traditional interface without the voice system, while 13 literate and 13 non-literate users were recalled to test the assisted voice based system. The results are presented in table 1.

Table 1. Usability Evaluation with and without voice system

	Usability Without voice system		Usability With voice system	
Criterion	Literate	Non-literate	Literate	Non-literate
Understanding via Observation Sheet				
Cash Withdrawal	6.64	2.6	8.53	7.30
Fund Transfer	4.56	0.88	8.61	7.38
Balance Inquiry	6.84	2.84	8.23	7.46
Time Taken in Seconds				
Cash Withdrawal	112.76	234.45	140.9	482.09
Fund Transfer	253.62	1201.5	362.09	535.11
Balance Inquiry	53.23	116.62	96.09	132.1
Error Rate in Percentage				
Cash Withdrawal	52%	92%	38%	84%
Fund Transfer	80%	100%	30%	84%
Balance Inquiry	56%	96%	61%	61%

The results show that an assistive voice icon helps low and non-literate users to make basic transactions such as cash withdrawal, fund transfer and balance inquiry at ATMs using traditional text-based interfaces.

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Classification Models for New Language Communities: Building Domain-Specific Message Categorization

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U-Report is a social messaging tool developed by UNICEF that allows people in developing countries to respond to polls, report issues, and become agents of positive change within in their communities. This program, which has grown to serve over 15 countries in 3 years, is already outpacing the ability of UNICEF and its partners' human workforce to review incoming messages. Incoming messages vary in urgency, from greetings and appreciation to imminent public health and security risks. We present a procedure for automatically identifying and classifying urgent messages via bootstrapping human-labeled data to build semi-supervised classification models.

Semi-supervised classification is a well-known tool for text categorization. Yet in many domains it remains difficult to use because of need for human-labeled training data. We show how creating a feedback loop between human judgments and machine predictions both accelerates annotation and improves message classification accuracy. Using this labeled data, we train seven independent classifiers to identify messages related to specific topics of interest to UNICEF. We compare the classifiers' ability to identify important messages to a baseline where analysts are able to read a fixed number of messages per day. We note significant increases in f-score, ranging from 0.16 to 0.6, when switching from the naïve appproach to ours. We currently label thousands of messages per day for U-Report Nigeria in real time, and use small holdout sets to continue monitoring precision and recall. Future work will involve extending our language-agnostic text classification methods to build categorization models in additional non-English languages served by U-Report.

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